

2018 MCCC Michigan State Report

Contact Information

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RESEARCH- On-going cover crop research (by primary discipline)	
Name(s)	Project title/objective
COMMODITY SPECIFIC	
Bird, G., Kaatz, P and Quintanilla, M.	SCN Trap Crop Development
Basso, B., Quintanilla, M., Rosenzweig, N., Bird, G., and Otto, M.	Integrated Advancing Technologies for Increasing Sustainability of Michigan Potato Systems
Bird, G., N. Rosenzweig, L. Tiemann, B. Basso, R. Black, C. Long, M. Otto, C. Carr, B. Morgan, and R. Rant,	On-farm soil health research: With special reference to bio-based systems. Michigan Potato Industry Commission
Bird, G., N. Rothwell, D. Baas, B. Klein, and K. Powers	Impact of cover-crops/mulch/compost on tart cherry orchard development/productivity and soil health. Michigan Cherry Council supported
Cassida, K.A., and J.J. Paling.	Cover Crop Variety Test. Funded by public entries.
Hill, E.	Maximizing the cover crop potential of cereal rye before soybean through alternative termination timings and methods. Michigan Soybean Promotion Committee
Hill, E.	Maximizing cover crop biomass production and weed suppression in field crop rotations by 'planting green'. Project GREEN
Jean, M. and E. Hill	Millet Variety trial in potato production. 2017 & 2018
Long, C., L. Tiemann, N. Rosenzweig, and E. Hill	Impact of increased cropping system diversity as measured by improved productivity and sustainability in a Michigan potato production system. Project GREEN and MI Potato Industry Commission 2016 & 2017
Renner, K., C. Sprague, L. Tiemann, P. Gross, J. Dedecker, and A. Brooker (Ph.D. student)	Early interseeding of cover crops into corn, exploring species, mixtures, and timings. Project GREEN and Corn Marketing Program 2017.
Renner, K., C. Sprague, A. Brooker.	Interseeded cover crop tolerance to soil-applied and post-emergence herbicides in corn. Corn Marketing Program 2018. Submitted to GREEN 2018
Szendrei, Z., D.C. Brainard, M. Hausbeck, Z. Hayden et al.	Integrating Organic cucurbit science and production in the Midwest. USDA-NIFA-OREI 2016-2019
Szendrei, Z., D.C. Brainard, M. Hausbeck, Z. Hayden et al.	Integrating organic cucurbit science and production in the Midwest. USDA-NIFA-OREI 2016-2019
FORAGES/FEED	
Cassida, K.A., and J.J. Paling	Annual Forage Variety Tests
Cassida, K.A., and J.J. Paling	Red Clover Variety Tests
Cassida, K.A., J. Lindquist, P. Kaatz, J. Isleib	Yield and Nutritive Value of Annual Legumes in Michigan Forage Systems. Project GREEN, 2016-2018.

Cassida, K.A., R. A. Ehrhardt, J.A. Schwehofer, and E Recktenwald.	Integrating Lamb Grazing Systems with Crop Production for Michigan. Michigan Alliance for Animal Agriculture, 2019-2021.
Renz, M., W.R. Osterholz, J.H. Grabber, K. Cassida, E. Burns, J. Williamson, and D. Bjorneberg	Identifying factors to optimize establishment of alfalfa interseeded in corn. NIFA Alfalfa & Forage Research Program, 2017-2019.
Singh, M., B.J. Wilke	Developing profitable double crop systems after winter barley. NCR SARE Partnership Program, 2018-2020
Wilke, B., H. Straub III, S. Utsumi	Integrating Annual Forages into a perennial grazing systems
Wilke, B.J., K.A. Cassida	Double cropping with cereal grain forages
PEST/DISEASE MANAGEMENT	
Bird, G., J. Shoemaker (M.S. Student)	Assessing the trap crop potential of cover crops for control of Soybean Cyst Nematode
Sprague, C.L., E. Hill, K. Renner	Integrating Fall-Planted Cereal Cover Crops to Improve Weed Suppression and Management of Glyphosate-Resistant Horseweed. 2018-2020. Project GREEN.
Sprague, C.L., K. Renner	Glyphosate-resistant horseweed (marestalk) management in soybean. 2018. Michigan soybean Promotion Committee.
SOIL FERTILITY	
Renner, K. C. Sprague, B. Basso, L. Tiemann, and A. Brooker.	Early interseeding of cover crops in corn: Crop productivity and soil health. USDA-NIFA 2017-2020.
Rosenzweig, N., K. Steinke, J. Calogero, A. Chomas, and S. Mambetova.	Crop rotations and organic amendments to reduce soil-borne disease severity. Michigan Potato Industry Commission and Project GREEN, 2013-2022.
Rosenzweig, N., L. Tiemann, and K. Steinke	Enhancing soil health in U.S. Potato Production Systems. USDA-SCRI 2018-2022.
SOIL SCIENCE/ HEALTH/ BIOLOGY- OTHER	
Asher, A. J., Tiemann, L. K., Ehsan, G.	Connecting Soil Health Functions to Water Quality at Edge of Field and Watershed Scale (MDARD funding)
Kravchenko, A., Renner, K.A., Guber, A., Tiemann, L., Baas, D., Miller, S., Millar, N.	Transition to organic in row-crop systems: enhancing sustainability in topographically diverse Midwest landscapes USDA- Organic Transitions
Rangarajan, A., D.C. Brainard, E. Gallandt, Z. Szendrei, L. Rodriguez, V. Morrone et al.	Farmer-Designed Systems to Reduce Tillage on Organic Vegetable Farms. USDA-NIFA-OREI 2014-2018
Snapp, S. et al.	Long Term Ecological Research with some rotations including cover crops
Tiemann, L. K.	Building soil health through rotational diversity and soil microorganisms (Foundation for Food and Agriculture Research funding)

PUBLICATIONS, EXTENSION/OUTREACH

Bulletins and Factsheets

- Hill, E., and C. Sprague. 2018. Cover Crop Termination. MSU Extension CC-02, East Lansing, MI.

- Cassida, K., J. Paling, and C. Kapp. 2018. *2017 Michigan Forage Variety Test Report*. MSU Forage Factsheet 18-01, 37 pages. Published Feb. 1, 2018. <https://forage.msu.edu/publications/> (Online.) https://forage.msu.edu/wp-content/uploads/2018/02/149374-MSU-Forage-Varieties-Printed-Bulletin-January-2018-corrected_v4.pdf
- Wilke, B.J. 2019. Double Cropping With Cereal Grain Forages: 2018 Report. *W.K. Kellogg Farm Research Highlights*. <http://farm.kbs.msu.edu/wp-content/uploads/sites/4/2019/02/Cover-Crop-Forages-after-Corn-Silage.pdf>

MSU Extension News Articles Available @ www.covercrops.msu.edu

- Baas, D. 2018. Cover Crop Field Walk on April 26 to focus on winter survival. MSU Extension news. April 17, 2018.
- Baas, D. 2018. Midwest Cover Crops Field Guide now available as a mobile app. MSU Extension news. April 26, 2018.
- Baas, D, D. Brainard and Z. Hayden 2018. Cover crop innovations on vegetable farms: What's new? June 5, 2018.
- Baas, D. 2018. Cover crop field day hosted at Kellogg Biological Station. MSU Extension news. October 25, 2018.
- Jean, M. and E. Hill. 2017 Upper Peninsula pearl millet trial. MSU Extension news. December 4, 2017.
- Jean, M. and J. DeDecker. Cover crop field walk on May 3 to focus on interseeding. MSU Extension news. April 25, 2018.
- Jean, M. and A. McFarland. Cover crop mixture trial in Michigan's Upper Peninsula- Part 2: Feed quality. MSU Extension news. April 23, 2018.
- Jean, M. and A. McFarland. Cover crop mixture trial in Michigan's Upper Peninsula- Part 1: Yield. MSU Extension news. March 21, 2018.

Webinars

- Burns, E. and K. Cassida. Mar. 5. 2018. "Interseeding Alfalfa into Corn" MSUE Field Crops Webinar Series. https://mediaspace.msu.edu/media/Interseeding+Alfalfa/1_w4196a6d Realtime Audience: 47, 16 webviews.
- Snapp, S. "Getting started with organic matter basics" Beginner farmer MSU webinar series. Feb 14, 2018.

PUBLICATIONS, SCIENTIFIC

Refereed

- Buchanan, A.L., Hooks, C.R.R. 2018. Influence of winter cover crop mulch on arthropods in a reduced tillage Cucurbit system. *Environmental Entomology*. 47: 292-299.
- Frost, M.D., Haramoto, E.R., Renner, K.A., Brainard, D.C. 2019. Tillage and cover crop effects on weed seed persistence: Do light exposure and fungal pathogens play a role? *Weed Science*, 67:103-113.
- Kravchenko, A.N., Fry, J.E., Guber, A.K. 2018. Water absorption capacity of soil-incorporated plant leaves can affect N₂O emissions and soil inorganic N concentrations. *Soil Biology and Biochemistry*, 121:113-119.

- Kutlu, T., Guber, A.K., Rivers, M.L., Kravchenko, A.N. 2018. Moisture absorption by plant residue in soil. *Geoderma*, 316:47-55.
- Lowry, C.J., Brainard, D.C. 2019. Strip intercropping of rye-vetch mixtures: Effects on weed growth and competition in strip-tilled sweet corn. *Weed Science*, 67:114-125.
- Maestrini, B., Basso, B. 2018. Drivers of within-field spatial and temporal variability of crop yield across the US Midwest. *Scientific Reports*, 8 (1), art. no. 14833,
- Melakeberhan, H., Maung, Z., Lee, C.-L., Poindexter, S., Stewart, J. 2018. Soil type-driven variable effects on cover- and rotation-crops, nematodes and soil food web in sugar beet fields reveal a roadmap for developing healthy soils. *European Journal of Soil Biology*, 85: 53-63.
- Rutan, J., and K. Steinke. 2019. Corn Nitrogen Management Following Daikon Radish and Forage Oat Cover Crops. *Soil Sci. Soc. Am. J. O.* doi:10.2136/sssaj2018.07.0269
- Shoemaker, J., Bird, G. 2018. Evaluation of potential cover and trap crops for management of *Heterodera glycines* in Michigan. 2018. *Journal Nematology* Volume: 50: 656-657
- Snapp, S., Surapur, S. 2018. Rye cover crop retains nitrogen and doesn't reduce corn yields. *Soil & Tillage Research*. 180:107-115.

Thesis/Dissertation

- Shoemaker, J. 2018. Impact of *Raphanus* and *Brassica* Cultivars on *Heterodera Glycines* (Nematoda) Population Development. M.S. Thesis. Department of Entomology. Michigan State University. 66 pp.

PRESENTATIONS, EXTENSION

Grower Field Days

- April 20, 2018. Cover Crop Field Walk, Midland MI. Attended by 10 (P. Gross, C. Curell)
- April 26, 2018. Cover Crop Walk. Kellogg Biological Station, Hickory Corners, MI. Attended by 8 (B. Wilke, D. Baas).
- May 10, 2018. Cover Crop Field Walk, Manistee, MI. Attended by 20. (C. Curell)
- May 2018. Northern Michigan Cover Crops Field Day. Attended by 40. (K. Renner)
- June 13, 2018. Forage and Cover Crop Walk, Upper Peninsula Research & Extension Center, Chatham, Michigan. Attended by 46. Invited. (K. Cassida, J. Isleib, M. Jean)
- June 16, 2018. Field Day on the Farm - Waishkey Bay Farm, Brimley, MI. Attended by 37. (D. Baas)
- June 28, 2018. 2018 Ag Innovation Day: Focus on Fruit and Vegetable Technologies. Southwest MI Research & Extension Center, Benton Harbor, MI. Attended by 252. (D. Baas, P. Gross, C. Curell, D. Brainard, Z. Hayden)
- July 27 – 28, 2018. Christmas Tree Growers. Mason, MI. Attended by 405. (C. Curell, D. Baas)
- Aug. 7, 2018. Western Lake Erie Basin – Field to Lake, New Bavaria, OH. Attended by ~150. (D. Baas, P. Gross)
- Aug. 8, 2018. Center of Excellence Field Day. Attended by 100. (K. Renner)
- Aug. 9, 2018. Cover Crop Field Walk, Clinton County, MI. Attended by 12. (P. Gross, D. Baas)
- Aug. 25, 2018. Cover Crop Field Walk, Bear Lake, MI. Attended by 13. (C. Curell)
- Sep. 20, 2018. Cover Crop Field Walk, North Branch, MI. Attended by 31. (C. Curell, P. Kaatz)
- Sep. 28, 2018. Managing Herbicide-Resistant Horseweed (Marestail) with Cover Crops and Other Strategies. Attended by 15. (C. Sprague, J. Schramski)
- Oct. 4, 2018. Cover Crop Field Walk. Monroe County, MI. Attended by 23. (R. Costa, D. Baas).

- Oct. 18, 2018. Cover Crop Field Walk, Focus on covers as forages. Attended by 13 (Gross, Thurlow, Lindquist)
- Oct. 25, 2018 Cover Crop Field Day. Standish MI. Attended by 35 (P. Gross, C. Curell)
- Nov. 1, 2018. Cover Crop Field Day. Kellogg Biological Station, Hickory Corners, MI. Attended by 45. (Brook Wilke, D. Baas)

Grower Meetings

- Jan. 6, 2018. Michigan Sheep Producers Association – Cover Crop Session. Lansing, MI. Attended by 35. (D. Baas)
- Jan. 26, 2018. Ag Action Day. Kalamazoo, MI. Attended by 143. (D. Baas)
- Jan 26-27 2018. Northern Michigan Small Farm Conference, ‘Targeting tillage and cover crops for improved soil health and crop performance’ (S. Snapp)
- Jan 30-Feb 1, 2018. Mid-Atlantic Fruit and Vegetable Convention ‘Healthy soils and cover crops for roots, tubers’ Talk for growers at Hershey, PA. (S. Snapp)
- Jan. 2018 - Interseeding Cover Crops in Corn in Michigan. Northern Michigan Winter Extension Meeting, Alpena, MI. Attended by ~30. (K. Renner)
- Feb. 7, 2018. Southwest Fruit Days Benton Harbor MI. Attended by 100 (C. Curell)
- Feb. 10, 2018. Michigan and Ontario Cover Crop Networking Meeting. Brown City, MI. Attended by 20. (D. Baas, C. Curell, P. Kaatz)
- Feb 22 2018. “Managing soils and cover crops for healthy crops” Saginaw Bay Watershed Conservation Lunch and Learn Series (S. Snapp)
- March 19-22, 2018. ‘Perennial future for wheat production’ Rank Symposium, Lake District, England. Invited talk (S. Snapp)
- May 8, 2018 - Doubling Up: Forages as Cover Crops, St. Joseph County 2018 Breakfast Meeting. (K. Cassida)
- March 21, 2018. Cover Crops and Soil Health. Hillsdale County. Attended by 30 (C. Curell, P. Gross)
- Aug. 8, 2018. Michigan Grape Society Grower Meeting. Benton Harbor, MI. Attended by 60. (D. Baas)
- Sept. 11, 2018. Cover Crops in Nurseries. Lake City, MI. Attended by 40 (C. Curell)
- Dec. 18, 2018. Forage Research Update. 2018 Integrated Crop and Pest Management Update. MSUE, East Lansing MI. Attended by 200. (K. Cassida)
- 2018 - Interseeding Cover Crops in Corn in Michigan. The Natural Resource Conservancy Lunch and Learn, Richville, MI. Attended by ~50. (K. Renner).

Conservation Districts/NRCS/Drain Commission Field Days/Meetings

- March 9, 2018. Creative Management Options: Forage and Manure. Elkhart County Soil and Water Conservation District Bank on your Roots Cover Crop Meeting and Tradeshow. Elkhart, IN. ~100 participants. (B. Wilke)
- June 9, 2018. Education on the Farm, Chippewa, Luce & Mackinac Conservation Districts. Rudyard, MI. Attended by 58. (D. Baas, J. Isleib)
- July 11, 2018 Nature Conservancy Field Day, Frankenmuth MI., Attended by 250 (D. Baas, P. Gross, C. Curell, P. Kaatz)
- Aug. 7, 2018 Nature Conservancy Lunch and Learn, Richville MI. Attended by 60. (C. Curell)

- Aug. 8, 2018. Van Buren Fruit Field Day, Van Buren Conservation District, Paw Paw, MI. Attended by 25. (D. Baas)
- Aug. 24, Kent County Summer Cover Crop and Soil Health Tour. Attended by 75 (C. Curell)
- Sept. 7, 2018. Creative Management Options: Forage and Manure. Elkhart County Soil and Water Conservation District Bank on your Roots Field Day. Ligonier, IN. ~85 participants. (B. Wilke)
- Sept. 18, 2018. Barry County Conservation District Aerial Cover Crop Seeding Field Day. ~40 participants. (B. Wilke).
- Sept. 20, 2018. Cover Crops, Pesticides, and Grazing. Growing Green Field Day. Sponsored by NRCS, Eaton Conservation District, MAEAP, MSU Extension, Michigan Angus Association and Eaton County Farm Bureau, Olivet, MI. 30 participants. (K. Cassida, J. Lindquist)
- Sept. 26, 2018 Cisco Seed Field Day. Blanchard MI. Attended by 25 (P. Gross, C. Curell)
- August 23, 2018. Blue Water Conservation District Meeting, St Clair County, Benefits of Cover Crops in Rotations, attended by 35 (Gross)
- Sept. 6, 2018, Ionia County SCD, Cover Crops and Soil Health. Attended by 12 (Gross)
- October 26, 2018, Missaukee Co SCD, McBain MI, Cover Crop Field Day. (Curell, Gross)

Extension Schools and Training

- Feb. 27, 2018. “Forage Species for Grassfed Beef Systems.” Grass-fed Beef School, Tustin, MI. Attended by 45. (K. Cassida)
- Sept. 27-28, 2018. Beginner Grazing School, Hickory Corners and Lake City, Michigan. Attended by 32. (D. Baas, K. Cassida, R. Ehrhardt, K. Gould, P. Kaatz, M. Klotz, J. Lindquist, J. Rowntree, H. Straub, K. Thurlow, F. Wardinsky, Brook Wilke)

PRESENTATIONS, SCIENTIFIC/SOCIETY

- Brooker, A., C. Sprague, and K. Renner. 2018. Herbicide selection for interseeding cover crops in corn. North Central Weed Science Society Annual Meeting. Dec. 3-6, 2018. Milwaukee, WI.
- Brooker, A., K. Renner, C. Sprague, and L. Tiemann. 2018. Interseeded cover crops competitiveness in grain corn. Weed Science Society of America Annual Meeting. Jan. 29 – Feb. 1. Arlington, VA.
- Brooker, A., L. Tiemann, K. Renner, and C. Sprague. 2018. Early interseeding of cover crops in corn alters subsequent year’s nitrogen dynamics. ASA-CSSA International Meeting. Nov. 4-7, 2018. Baltimore, MD.
- Cassida, K.A., R.M. Martin, J.E. Rowntree, and J. Schwehofer. 2018. Finishing forages for grass-fed beef. Online. In: Proc. American Forage & Grassland Council, Jan. 14-16, 2018, Louisville, KY. AFGC, Berea, KY.
- Curtright, A., Tiemann, L. K., Renner, K., Sprague, C., Brooker, A. 2018. Improving Soil Health and Nitrogen Use Efficiency through Early Inter-seeded Cover Crops. Soil Health Institute Annual Meeting, August 1-3, 2018, Albuquerque, NM.
- Long, C., Tiemann, L., Rosenzweig, N., Hill, E., Quintanilla, M., Jean, M., and Zavislan, K.A. 2018. Increasing productivity in potato production systems by increasing cropping systems diversity. 2018 Potato Association of America, July 23-26, 2018. Boise Idaho.

- Renz, M.J., W.R. Osterholz, J.H. Grabber, K.A. Cassida, E.E. Burns, J.A. Williamson, and D.L. Bjornberg. 2018. Identifying factors to optimize establishment of alfalfa interseeded in corn. 2018 Joint Conference of NAAIC, Trifolium, and Grass Breeders, June 4-6, 2018. Logan Utah.
- Schramski, J., C. Sprague, and K. Renner. 2018. Integrating Fall-Seeded Cereal Cover Crops for Horseweed Management in No-Tillage Soybean. 73rd Annual North Central Weed Science Society Meeting. Milwaukee, WI. Dec. 4.
- Shoemaker, J. and G. Bird. 2018. Host status evaluation of cover crops for management of *Heterodera glycines* in Michigan soybean production. Society of Nematologists Annual Meeting 2018. Aluqueque, New Mexico, July 22-25.
- Snapp, S. 2018. 'Is Sustainable Intensification of Agriculture Possible?' Sustainable Agriculture Symposium, Iowa State University. April 18-19, 2018. Keynote talk
- Steinke, K., and J. Ratan. 2018. Corn nitrogen management following cover crops and the microbial response. *In* 2018 North Central Extension Industry Soil Fertility Conference, 48th Annual Meeting, Des Moines, IA, 14-15 Nov. 2018. International Plant Nutrition Institute, Peachtree Corners, GA.
- Tiemann, L. K., Curtright, A., Renner, K., Sprague, C., Brooker, A. 2018. Nitrogen Use Efficiency and Internal Nitrogen Provisioning with Interseeded Cover Crops As an Indicator of Soil Health Status. Soil Science Society of America International Soils Meeting, January 6-9, 2018, San Diego, CA.

MICHIGAN STATE UNIVERSITY COURSES THAT DISCUSS COVER CROPS

CSS 101- Introduction to Crop Science	ENT 205H- Pests Society and the Environment
CSS101L- Introduction to Crop Science Lab	ENT 479- Organic Pest Management
CSS 201- Forage Crops	HRT 251- Organic Farming Principles and Practices
CSS 212- Advanced Crop Production	HRT 341- Vegetable Production and Management
CSS 288- Principles of Weed Management	
CSS 360- Soil Biology	
CSS/BSE/FOR 467- BioEnergy Feedstock Production	
CSS480- Soil Fertility and Nutrient Management	
CSS 488- Agricultural Cropping Systems: Integration & Problem Solving	

To learn more about particular projects, contact the investigators:

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